

PASSIVELY ENCOURAGING OFFLINE NETWORKING IN SMALL,
CONCENTRATED COMMUNITIES THROUGH UI/UX DESIGN

By

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Abstract

The goal of this project is to identify whether it is possible to encourage users to communicate with one another face-to-face through User Interface (UI) and User Experience (UX) design. It is well known that users can be maliciously manipulated by design elements and that concerns have been raised about the effects of social media on interpersonal communication. The key is to find non-harmful means of guiding users to the desired action of speaking face-to-face with others. User testing for a custom web app was conducted for the purposes of this project. It is hoped that the results will provide developers with new consideration for UI and UX design.

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To the five user testing participants –

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1. Introduction

A Google search for “effects of social media on communication” [Google Search, 2019] will return many results describing alleged negative effects, some of which offer suggestions oriented to users who wish to make an effort to reduce their time on social media [Hanke, 2018]. This begs the question: is it possible for developers to encourage face-to-face interaction through the design of the User Interface (UI) and User Experience (UX)?

1.1. Background

There has generally been an increase in the prevalence and usage of social media for communication purposes since it was first introduced [“Social Media Fact Sheet”, 2018]. Along with this, there are now a number of ways that users can be influenced or outright manipulated due to instances where sites and web apps have been maliciously designed [Gray, 2018].

Another consequence of the rise of social media is a notable decrease in face-to-face communication [Pease, 2015]. Even without a formal study, it is not hard to see that time spent communicating through electronic means is time not spent communicating face-to-face. This is not to say that chat apps are not beneficial, at times they may be the only communication method available.

Now, given that users can be manipulated and that users are spending noticeably less time communicating face-to-face, it should be possible to design UIs for sites and web apps in such a way that it encourages users to communicate in person, both where reasonable and without harming user experience.

To explore this possibility, a personal movie database web app was chosen for implementation. Movie databases are a type of social media where the ability of users to communicate with one another through the service is a tertiary feature, rather than a main or even a secondary feature. In other words, the purpose served by a movie database is neither aided by the appearance nor impeded or lack of

functionality that would allow users to directly communicate with one another through the service. This makes a movie database a good candidate for assessment.

1.2. Scope

The goal of this project is to utilize a personal movie database to explore whether members of a small, concentrated community could be encouraged to speak face-to-face under certain conditions. In particular, when they are presented with a lack of ability to communicate or interact with others through the service while there are restrictions on where the service can be accessed from.

1.3. Outline

Related work that led to the project's scope is discussed in section 2. In section 3, details of the design and implementation of the personal movie database are described. The user testing methods are outlined in section 4, the data collected from the testing are presented in section 5, and then evaluated in section 6. Sections 7 and 8 discuss and draw conclusions about the results of the user testing.

2. Related Work

Communication is an important part of daily life and studies have shown that the method of communication matters. Social media allows users to connect in a variety of ways, but not always in the best interest of users. This is where and the ethics subject of dark patterns comes in.

Users of social media platforms can be manipulated by the UI presented to them. This can be as subtle as a button that does not quite look like a button or as obvious as a site like Facebook cajoling users to not delete their account with claims that their friends will miss them [LaBarre, 2018]. Such manipulations range from mild annoyances to being blatantly unethical. The UI should be designed without causing harm to user experience.

2.1. Relevant Papers

The two most relevant subjects to this project are the relationship between technology and face-to-face communication as well as UI/UX design. Prior work ["Social Media Fact Sheet", 2018; Drago, 2015; Corcoran, 2012; Subramanian, 2017] on the former subject has established that technology does have negative effects on face-to-face communication. The latter subject describes the evaluation and characteristics of good and bad design.

2.1.1. Technology and Face-to-Face Communication

As of 2018, 88% of adults aged 18-29 reported using at least one social media site while ten years prior, it was approximately 60% for that age group ["Social Media Fact Sheet", 2018]. Adults aged 30-49 and 50-64 have seen similar increases, though have lower percentages for both 2008 and 2018 compared to the 18-29 age group ["Social Media Fact Sheet", 2018]. From this, it is clear that the use of social media is very common, but these trends do not indicate whether this is a generally good or bad occurrence.

Multiple studies on that subject are in agreement that there are negative effects on users, particularly when it comes to face-to-face communication [Drago, 2015;

Corcoran, 2012; Subramanian, 2017]. One study, which focused on new media technologies in the home, stated that the technologies “did not encourage face-to-face interaction” [Corcoran, 2012] and explained that even in the home, users were communicating face-to-face less. Another study acknowledges that social media does have its place, but that “nothing can replace face-to-face conversation and interactions” [Subramanian, 2017].

2.1.2. Dark Patterns

It is through dark patterns that websites across the internet manipulate users into taking or not taking certain actions such that the end result is undesirable for the users. A full list of dark patterns and their descriptions can be found on darkpatterns.org ["Types of Dark Pattern.", 2019]. The dark patterns described in the following subsections have been identified as the ones that a personal movie database would be most at risk of having.

Confirmshaming is characterized by antagonizing the user with a biased message, especially with yes/no prompts ["Types of Dark Pattern.", 2019]. To avoid this pattern, all messages and action items visible to users will have neutral language or an icon representing the intended action.

Misdirection is often seen in the case of buttons, where one button is designed to draw the eye and a nearby related button is smaller, with paler text, and may not even look like a button [Gray, 2018]. To prevent falling into this pattern, all menu buttons in the header are styled the same way and all buttons in the body are styled in the same way. Additionally, the styling of links is distinct from that of buttons and links to external pages are styled in a different manner than links to internal pages.

Privacy Zuckering is named after the creator of Facebook, this pattern is characterized by tricking users into publicly sharing more personal information than they might want [Gray, 2018]. The easiest way to avoid this is to simply not allow user information to be public to begin with. This pattern can be further

avoided by taking only very minimal information from users. For example, first and last name only.

2.2. Real World Examples

There are some existing services and products that do encourage users to take a particular action without stepping into the territory of dark patterns. A few examples are Flipgrid, Pokémon GO, and the Baldur's Gate video game series. Each uses a different method or different combination of methods to elicit the performance of the desired action(s) from users.

2.2.1. Flipgrid

Flipgrid is a “social learning” [“Flipgrid. Ignite Classroom Discussion.”, 2019] tool for teachers to utilize for student assignments or assessments. A valid camera is required to use the service. Additionally, once a camera has been successfully connected, there is no option to disable it in the case that a user does not wish to record video of themselves. The only method to give audio-only responses is noted on the guide available for “camera shy” [“Flipgrid. Ignite Classroom Discussion.”, 2019]¹ students within the Flipgrid help articles. This method is to simply “cover the camera” [“Flipgrid. Ignite Classroom Discussion.”, 2019]¹ due to the distinct lack of alternatives provided by the service.

The Flipgrid service is designed for users to record both audio and video, but not all users may wish to record video. For such users, the lack of an option to decline to record video in the Flipgrid interface encourages them to identify a way to not make a video recording. Whether users come up with the idea on their own or they find the “camera shy” guide, they will reach the same conclusion: to not record video, they must cover their cameras.

2.2.2. Pokémon GO

Launched in 2016, Pokémon GO [“Pokémon GO!”, 2016] is a popular augmented reality mobile game with users all around the globe. There are some

¹ “Camera Shy? Tips for all Students” on help.flipgrid.com.

ways that users are able to interact with one another in-game, like trading pokémon, but the app does not offer a way for players to chat with one another. This is because it is not intended for players to communicate through text-based messaging.

Niantic, the company that developed the game, has been vocal about how players should go out, walk, and meet with others [Hanke, 2016]. On the Pokémon GO website, the words “GET UP AND GO” [“Pokémon GO!”, 2016] are displayed in a large font size. Niantic’s suggestions are largely enforced by proximity-based components of the game. For example, trading can only be performed when two users are within a certain distance of one another [“Pokémon GO: Trading Pokémon.”, 2019].

Even if players are utilizing a separate app to communicate, they are compelled to play the game as intended by Niantic to trade pokémon, defeat higher-tiered raid bosses, and other player-interactive actions. It would be one thing for the company to simply tell players to interact in person, but Niantic has taken full advantage of the game’s need for the Global Positioning System (GPS) to successfully orchestrate player meetups.

2.2.3. Baldur’s Gate

Baldur’s Gate is a fantasy Role-Playing Game (RPG) series introduced late in 1998 [Interplay Entertainment, 1998]. Like many other RPG games, it has loading screens with tips and tricks. The creators of the game series have taken the opportunity presented by the loading screen messages to also offer real-world suggestions for players. One such tip states that “While your character does not have to eat, remember that YOU do...” [Interplay Entertainment, 1998]. A reminder like that may be helpful for those who play for an extended period of time, but the choice to follow the suggestion or not is ultimately up to the players.

2.3. Potential Approaches

The examples in section 2.3. encourage users to take certain actions using a variety of methods. These methods fall into two main categories: passive and

active encouragement. The distinction between the two is important, considering that users may be more receptive to passive rather than active encouragement or vice versa.

2.3.1. Active Encouragement

Pokémon GO and the Baldur's Gate video game series show a couple of ways active encouragement that can be implemented. One is to make announcements to users outside of the service interface about what actions are recommended. Another to put elements, like messages, within the UI that suggest certain actions to users. In the context of a personal movie database, the latter is the more applicable route.

Some methods of active encouragement include having a statically located message suggesting a movie night or other movie-based group activity, sending occasional notifications, having an occasional pop-up with a message for users, and perhaps having a feature that allows some manner of non-language-based interaction between users, like emoji reactions. Notifications could include suggestions of movies to watch with others or they could inform users that a movie they reviewed has been reviewed by another user.

Part of the challenge with active encouragement is identifying the line between helpful and bothersome – users tend to leave sites and services that have “low usability” [Brandtzaeg, 2007]. Additionally, there is a greater risk of dark patterns being employed to influence users as there is more opportunity for a web app equipped with messages and notifications to shame or guilt users into taking actions desired by the development team.

2.3.2. Passive Encouragement

Passive encouragement can be achieved through “digital nudging,” which is the use of “user-interface design elements to guide people’s behavior” [Weinmann, 2016]. What makes it different from dark patterns, is that it is not malicious, it is meant to aid users [Şebnem, 2019], but also allow “[developers to] achieve their goals” [Schneider, 2017]. Flipgrid and Pokémon GO utilize this concept and are

taking the same basic route: they “reduce [the] number of alternatives” [Johnson, 2012] to lead users to the intended usage of the services. For this project, there are a couple things that can be done to make face-to-face communication the “attractive choice [alternative]” [Johnson, 2012].

One method is to have a “limited time window” [Meske, 2017] for allowing the alteration of user-created content to prevent users from creating content for anything other than its intended purpose. For example, users could be allowed to review movies and have a short window in which they can edit reviews after posting them to prevent them from using reviews for chatting. When presented with the inability to directly interact with users through the web app, the obvious alternatives are face-to-face or electronic communication.

Another method is to employ “framing” to “[control the] presentation of a decision problem” [Mirsch, 2017]. The possible choices of where to access the web app from can be reduced by imposing limits on locations from which it is accessible. This can be used to prioritize face-to-face communication as the option of choice. For this project, utilizing methods that identify the geographic location of the user is unnecessary, but access to the movie database can still be restricted by making it private to the network it is hosted on. This means that users will have to be connected to that network to access the web app and therefore must be within the covered vicinity to utilize the web app.

3. Privately Hosted Index of Localized Movies (PHILM)

PHILM was designed and implemented to test whether people can be encouraged – through the design of the interface and user experience – to engage in face-to-face communication. It is a theatre-themed web app that allows users to search through an index of movies, which is curated by a user with administrative permissions. Non-admin users may not add movies because there is nothing to stop them from creating fake movie entries. Restricting the ability to add movies to administrators helps to preserve the integrity of the movie collection.

In the interface, PHILM provides basic details about each movie that a user may expect, such as the title, and also provides links through which users may garner further information. There are two main views: the search view, which lists many movies, and the individual movie view. The search view is designed to give users a quick glance at many movies at a time. The individual movie view allows users to view a single movie and explore reviews posted by other users.

3.1. Movie Details

PHILM displays the following metadata for the purpose of identifying movies:

- Movie Title
- Year Released
- Theatrical Release Poster

Thumbnail-sized posters do not violate copyright law because it is considered Fair Use. There are such precedents as *Bill Graham Archives v. Dorling Kindersley Ltd* [*Bill Graham Archives v. Dorling Kindersley Ltd.*, 2006], in which it was ruled that reproducing a thumbnail-sized Grateful Dead concert poster in a biographical book about the band was permissible under Fair Use.

Tertiary information to aid users in understanding what a given movie is about includes the following:

- List of Associated Genres
- IMDb Movie Link

- YouTube Trailer Search Link

A few associated genres are listed for each movie to give users an idea of what kind of movie it is. The IMDb link allows users to see what ratings and descriptions are provided there because they are not provided by PHILM. PHILM also does not provide trailers, so a link to a YouTube search for movie trailers is provided.

3.2. User Details

To prevent Privacy Zuckering, only the following user details are stored:

- Username
- First Name
- Last Name
- Avatar

More personal information than this would be unnecessary, as members of a community using PHILM are very likely to already know each other. Users cannot edit these themselves, but can talk to an administrator to make changes to these details. The avatar is an image of the user's choice. On reviews, only the avatar and username are displayed. On a user's profile page, their username, avatar, first name, and last name are all displayed.

3.3. Brief Implementation Overview

PHILM was built with Django, a Python-based web framework ["Django", 2019]; Foundation by Zurb, a frontend framework; and SQLite, a relational database [SQLite Home Page, 2019]. Icons from Font Awesome's free collection were used in the frontend.

Django and Flask are similar frameworks that were considered for this project. Django was ultimately chosen because authentication is present out-of-the-box ["Django", 2019]. As a direct result of that choice, SQLite was chosen because it is the default database for Django ["Django", 2019]. Foundation and Font Awesome were chosen for their ease of use.

3.3.1. Configuration

Five tables were added to the default Django database configuration as shown in Figure 3.1, with the Person table containing a Foreign Key (FK) to the Django User table to associate Person objects with User objects. There are separate tables for years and genres to help aid in searching for movies based on those criteria.

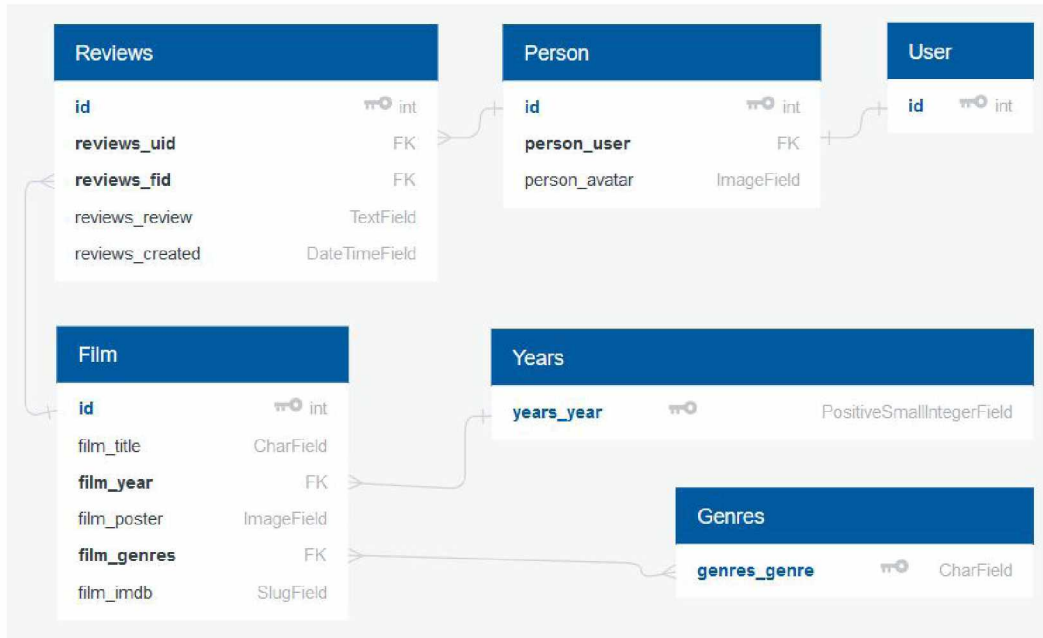


Figure 3.1: Database schema

3.4. Intended Use

The web app is intended to be used by a community consisting of a relatively small number of people. For reference, five users were recruited for purposes of group-based usability testing, though this is not to say a somewhat larger group could not be supported.

Now, as indicated by the name of the web app, it is intended to be hosted privately on a network belonging to the small community. Users are intended to only be able to access it when connected to that network.

The collection of movies displayed on the PHILM UI are intended to consist only of movies that the community has a physical or digital copy of. Ultimately,

the movies permitted to be displayed will be determined by the community utilizing the web app.

3.5. User Abilities

PHILM is designed such that all users must be authenticated to access movie information, user profiles, and user reviews. Authenticated users may perform the following actions within the PHILM UI:

1. Search through movies based on full or partial title
2. Search through movies based on inclusion or exclusion of genres
3. Search through movies based on inclusion or exclusion of years
4. View their own profile
5. View the profiles of other users
6. Post a maximum of one review per movie
7. Edit their review up to a few minutes after posting it
8. View the reviews of other users

As previously mentioned, non-admin users are not allowed to add movies. This is so that they cannot create fake movies, either as jokes or as a roundabout method of chatting with other users through the interface.

3.6. Administrator Abilities

In addition to being able to perform all actions a regular user can, users with administrative permissions can log in to the administrative interface and perform unlimited Create Write Update Delete (CRUD) operations on the following data types:

1. Films
2. Users
3. Groups
4. Years
5. Genres
6. Reviews

3.7. Explanation of Design Choices

PHILM was designed with the intent to encourage users to communicate with one another in person. This is complicated by needing to create a pleasant experience for users in addition to avoiding the blatant manipulations of dark patterns. Some decisions were made to create a pleasant experience for users, while others were made to passively encourage face-to-face communication.

Specifically for encouraging communication, there are two main factors that contribute. First, the target audience is a small, concentrated community, which means it is reasonable to restrict the location and that the users are likely to already know one another. Second, there is no method offered for users to directly interact with one another within the web app and restrictions on movie reviews prevent users from doing so in an indirect manner.

3.7.1. Location Restriction

As previously mentioned, PHILM is intended to be privately hosted, this is an effort to create a situation where users are nearby one another. As a result of the web app only being accessible on the network it is hosted on, users must be within the range of the network, which means that users will be relatively close by one another.

3.7.2. Reviews

Each authenticated user may post a maximum of one review per movie. After posting a review, the user who posted it has a five-minute window during which they may edit their review if they so choose. The five-minute time window is there to prevent users from attempting to use the reviews to chat with one another. Users also may not delete their reviews; this is so they cannot use a post-delete-post cycle to chat with others.

While the edit window has not passed, clicking the edit button will populate the text input field with the text currently in the user's review so that the user can

modify what they wrote. If a user does not click the edit button, they have the option to write something entirely new and replace their original review with that.

3.7.3. Search Abilities

To make searching for a movie easy, users may search by full or partial title, by genre, and by year. This was a choice made for the sake of usability. For genres and years, three-mode checkboxes were implemented. This is so users can specifically include and exclude genres and years to get the most relevant results for their search criteria.

For example, with three-mode checkboxes, a user who includes 'Action' and excludes 'Horror' will have search results containing all 'Action' movies that are not classified as 'Horror'. For two-mode checkboxes, the search results would include all movies classified as 'Action' and the user would have to manually check to see if a given movie was also classified as 'Horror'.

4. User Testing

To measure how well the web app performed in regards to the goal of the project, user testing was performed. This testing showed how the users interacted with and responded to the web app using a variety of scenarios and tasks. It is recommended to have “about five heuristic evaluators or test users” [Nielsen, 1993] and so, five people were recruited to test PHILM.

Usually, data is collected from individuals who perform tasks independently from one another [Krug, 2014], however, the target audience of PHILM is a group and not individuals. One of the best practices for user testing is to test with users from the target audience [Krug, 2014], so the testing for this project was designed for users to work as a group to meet the goals of the tasks.

4.1. Institutional Review Board (IRB) Review

It was determined that IRB review is unnecessary for this project, which is considered “evaluative” [Hundertmark, 2018]. Although user testing involves humans, it is not human testing. Reason being that the users are not the subject of testing, but rather the ones performing tests on the web app.

4.2. User Scenarios and Tasks

A few scenarios and associated tasks were created for the volunteer user group to work through to collect data about how users approach the act of using the web app. To prevent user bias, it was confirmed with the participants that they had not previously heard of the project – or if they had, did not know the end goal.

The tasks vary in complexity and two were specifically designed to be more difficult. For the first task of the second scenario, described in subsection 4.2.2, there was only one movie in the database that satisfied the conditions and the movie was not easily searchable based on those conditions. The second task of the second scenario, described in subsection 4.2.2, was also meant to be difficult, but not for all participants. That task was designed such that either one participant would fail while the other four succeeded or vice versa.

4.2.1. Scenario 1: User's Choice

With this scenario, participants were acting as themselves. They were instructed to complete the following tasks to the best of their abilities.

- Task 1: Movie Night
 - Identify a movie that they might watch if they were to have a movie night.
- Task 2: Review a Common Movie
 - Identify a movie that they have all seen and post a review on that movie's page.

4.2.2. Scenario 2: the Home

The participants were miscellaneous members of a household in this scenario. They were instructed to complete the following tasks to the best of their abilities.

- Task 1: Old, but New
 - Identify a black and white film released within the past ten years.
- Task 2: False Review
 - Each household member wrote a review for a movie of their choice, but one of them did not actually watch the movie that they reviewed.
 - Identify which household member it was.

4.2.3. Scenario 3: the Department Office

In this scenario, the participants were employees of an arbitrary department, which has a monthly movie night. They were instructed to complete the following tasks to the best of their abilities.

- Task 1: "This is Halloween" [The Citizens of Halloween, 1993]
 - It's October, the group wishes to watch a movie that fits the month's aesthetic. However, two members of the group refuse to watch a horror movie for their own reasons and another person is adamant that the movie cannot be animated.
 - Identify a movie that everyone can agree upon.

- Task 2: Uncommitted Coworker
 - This month, the group wants to watch an action/sci-fi movie. There is one person who is not caught up with the Marvel Cinematic Universe movies, but they are not sure whether or not they will attend the movie night.
 - Identify one or two movies that can be watched if the coworker attends and for the case that they do not.

5. Collected Data

To measure the time the participants took to complete tasks, their screens and voices were recorded. Screen recordings were created using the Open Broadcaster Software (OBS) and audio recordings were created with a Blue Yeti microphone and Microsoft Voice Recorder. Any names of participants that were visible in the videos or audible in the audio recording have been obscured by the author.

Four surveys were presented to the participants at various points during the user testing – copies of these are provided in Appendix B. Participants were asked to fill out a pre- and post-survey as well as the Single Ease Question (SEQ) and the System Usability Scale (SUS). The SEQ and SUS are two of several typical surveys used for user testing. The SEQ was chosen for its simplicity and task-level evaluation. The SUS was chosen for its versatility and comprehensiveness in system-level evaluation and is “among the best known post-study questionnaires” [Assila, 2016].

The user testing was conducted in a computer lab at the University of Alaska Fairbanks (UAF) campus. Participants were provided with access to virtual machines that were set up to connect to PHILM. The consent form and surveys were presented in the same order as the following subsections, where they are further described.

5.1. Consent Form

The main purposes of the consent form was to inform the participants that they would be recorded and that the collected data would be used for research purposes only. Appendix A shows a copy of the consent form. Although IRB review was not necessary for this project, a member of the UAF IRB recommended that a consent form be used for the recordings [Hundertmark, 2018]. The recording consent form template found on usability.gov ["Consent Form (Adult)", 2013] was employed and customized for the purposes of this project. After the participants gave their consent, they were presented with the pre-survey.

5.2. Pre-Survey Data

The pre-survey (see item B.1. in Appendix B) was presented to the participants before being given access to PHILM. This survey consisted on seven prompts and was used to gauge the general willingness of the participants to communicate face-to-face. Figure 5.1 shows the raw scores from the pre-survey, where the highest possible score is seven. The results are interpreted in section 6.1. The participants responded to the following prompts:

1. When preparing to watch a movie with others, I tend to discuss what to watch in face-to-face conversation with them.
2. After watching a movie with others, I tend to discuss the movie with them in face-to-face conversation.
3. When someone I know posts a review of a product or service and I agree with what they wrote, I am likely to start a conversation with them to discuss it.
4. When someone I know posts a review of a product or service and I disagree with what they wrote, I am likely to start a conversation with them to discuss it.
5. When initiating a conversation with someone who is in the same building as I am, I am more likely to walk over to them to start a conversation than send an electronic message.
6. When initiating a conversation with someone who is in the same room as I am, I am more likely to walk over to them to start a conversation than send an electronic message.
7. In general, I am likely to move an online conversation to a face-to-face conversation when in relatively close proximity to the person or people I am conversing with.

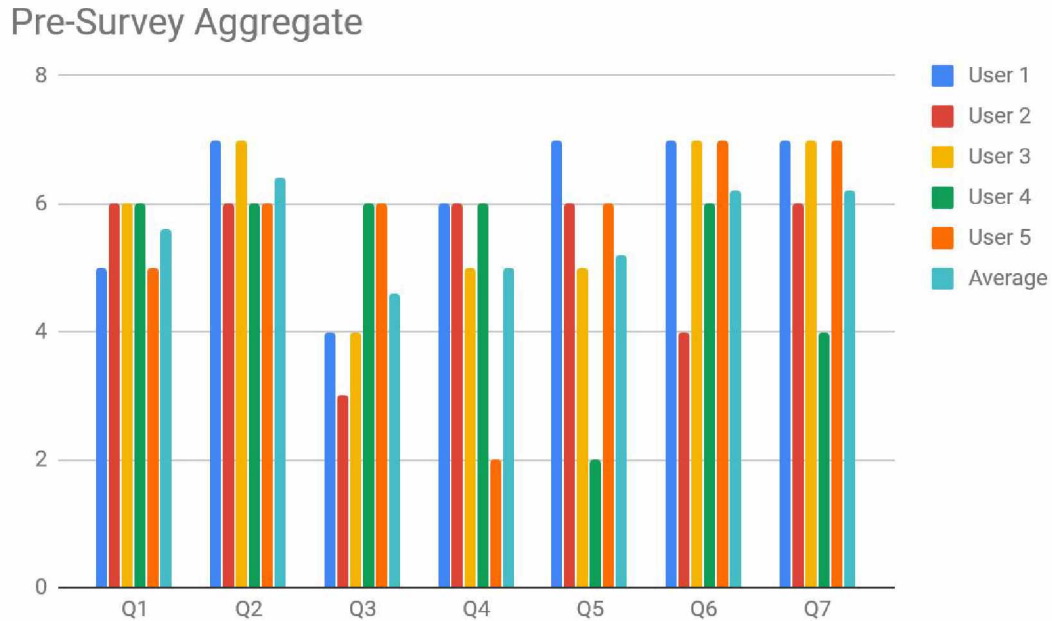


Figure 5.1: Pre-survey aggregate

5.3. SEQ Data

The SEQ was administered six times over the course of the testing. Participants were asked to answer the SEQ survey (see item B.2. in Appendix B) after completing each task. This is a “post-task [questionnaire]” [Assila, 2016] consisting of a single question that is considered “universal” [Assila, 2016]. This survey uses a seven-point Likert scale to identify how easy or difficult a task was for a user [Sauro, 2012]. Figure 5.2 shows the SEQ and Figure 5.3 shows the aggregate for each of the six tasks. The collected SEQ data is interpreted in section 6.2.

Overall, how difficult or easy did you find this task?

Very Difficult Difficult Somewhat Difficult Neutral Somewhat Easy Easy Very Easy

☐ ☐ ☐ ☐ ☐ ☐ ☐

Figure 5.2: SEQ with a seven-point Likert scale

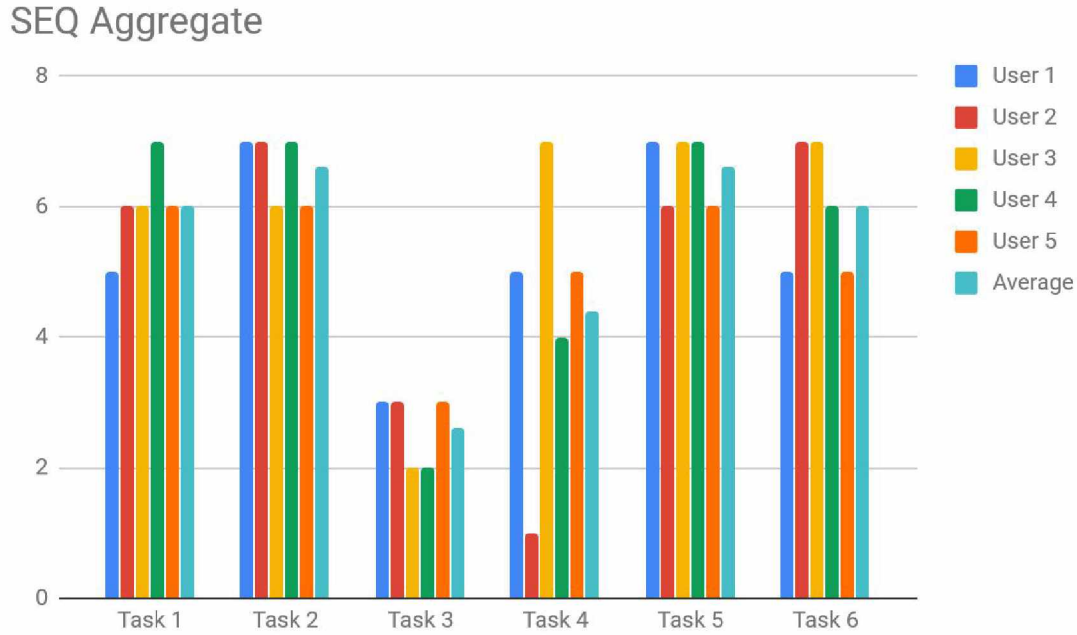


Figure 5.3: SEQ aggregate

5.4. SUS Data

Participants completed the SUS (see item B.3. in Appendix B) after testing was complete. The raw data is shown in Figure 5.4. This survey consists of ten standard prompts, which alternate in mood, on a five-point Likert scale [Thomas, 2019]. Scores for this survey range from zero to one hundred [Assila, 2016] where one hundred is the best possible score and zero is the worst. To calculate the SUS score, values from zero to four are interpreted from the responses and added together – that sum, multiplied by two and a half, is the SUS score [Assila, 2016]. A score of sixty-eight is considered average. The SUS score for PHILM is discussed in section 6.3. The participants responded to the following prompts:

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.

6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

Raw SUS Data

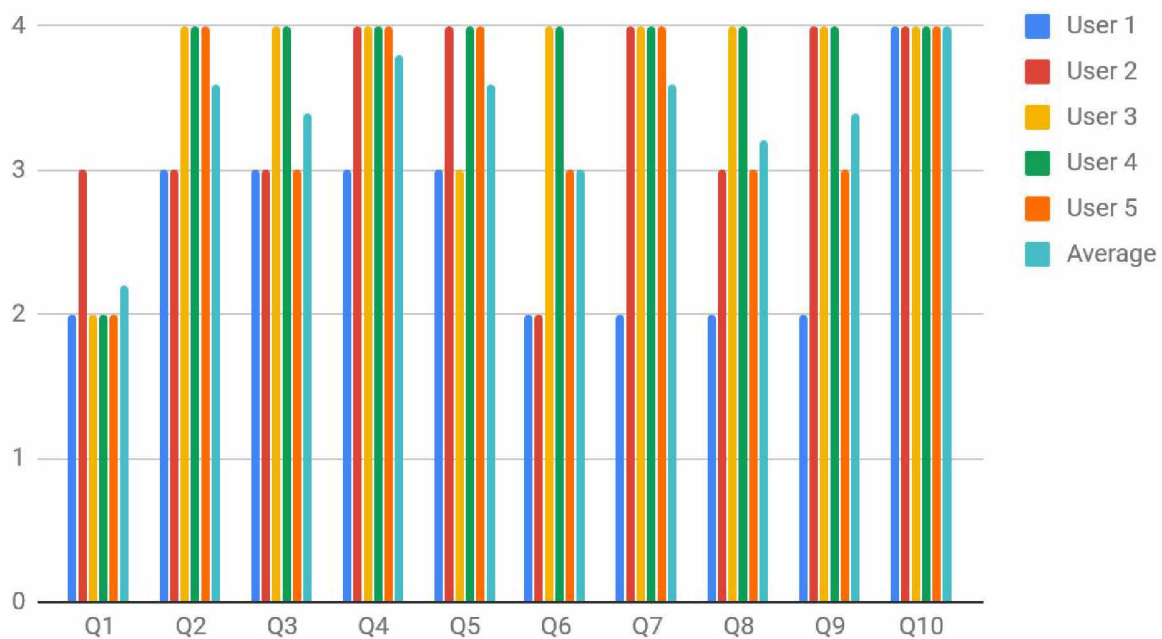


Figure 5.4: SUS aggregate

5.5. Post-Survey Data

After the SUS survey, participants were shown some alternate features of PHILM. This included a notes page for users, a link to the most recent ten reviews, the removal of the ability to edit, and an element that asked users what was for movie night. Once complete, the recordings were stopped and the post-survey (see item B.4. in Appendix B) was presented to the participants.

This survey consisted of ten prompts on a seven-point Likert scale and two open-response questions for general feedback on the web app. The prompts were

specific to PHILM and its purpose was to identify willingness to communicate face-to-face after encountering features of the web app that were intended to encourage offline networking. Figure 5.5 shows the raw scores for the survey and the data is interpreted in section 6.4. The participants responded to the following prompts:

1. I am more likely to discuss what movie to watch with others, if an element of the webapp directly tells me to do so.
2. I am more likely to discuss what movie to watch with others, if an element of the webapp suggests that I watch a movie with others.
3. I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I can see what they wrote about a movie on individual movie pages.
4. I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I cannot see what they wrote about a movie on individual movie pages.
5. I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I do have access to the most recently posted reviews.
6. I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I do not have access to the most recently posted reviews.
7. I am more likely to start a face-to-face conversation with someone rather than send an electronic message when I see they wrote a movie review that I agree with.
8. I am more likely to start a face-to-face conversation with someone rather than send an electronic message when I see they wrote a movie review that I disagree with.
9. I am more likely to start a face-to-face conversation with an administrator rather than send an electronic message, if I feel the need to amend a review I made and do not have the ability to edit it.

10. In general, I feel this is a convenient system and would like to use it or something like it for my own movie collection.

Post-Survey Aggregate

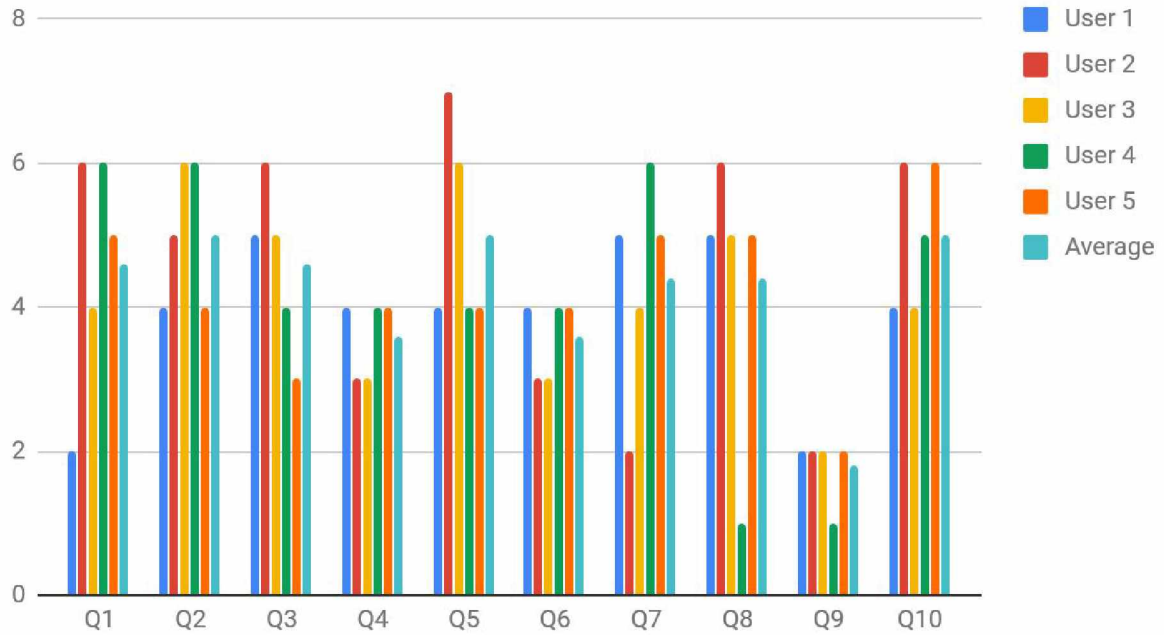


Figure 5.5: Post-survey aggregate

6. Data Evaluation and Discussion

6.1. Pre-Survey

The raw data from Figure 6.1 is interpreted as average percentages from the raw pre-survey data. For all but prompt three, the group was more than 70% in agreement with the prompts. Regarding the third prompt, a couple of participants explained that if they agreed with someone, there probably was nothing more to be said.

Overall, the pre-survey data indicates the participants were generally willing to communicate face-to-face to begin with. This is good because if they were against it, they would not have been receptive to being encouraged to talk. A few of the prompts considered the relationship between proximity and face-to-face communication. Most of the participants indicated that they would walk to another room to talk to someone, but a few noted that if it was far away, they would not.

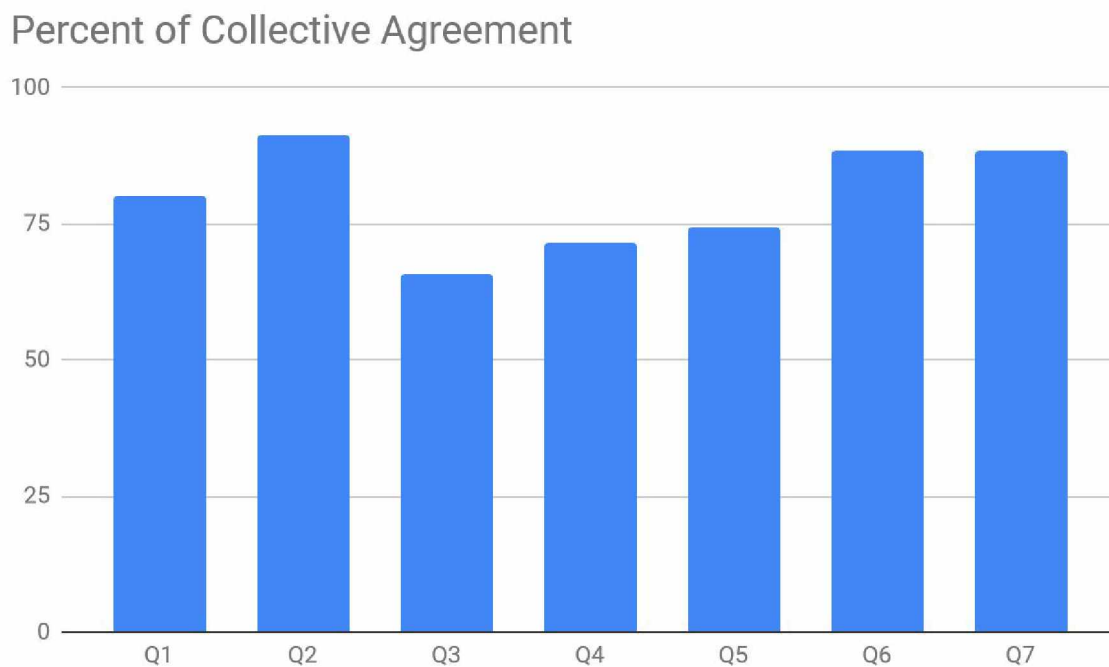


Figure 6.1: Pre-survey data interpreted as the average percent of agreement

6.2. Single Ease Question (SEQ)

When reorganized into a stacked bar chart, see Figure 6.2, it is clear at a glance which tasks the participants found easiest and hardest. This can be interpreted as how completable the various tasks were. Five users and seven points on the Likert scale makes for a score out of thirty-five points where a high score means a task was found to be easier and a low score means the opposite.

Tasks three and four have notably lower completable scores than the other four tasks; this was the expected outcome. Task three was designed to be more difficult: there was only one movie that fit the search criteria for the task and the most reasonable way to search for the movie was by year. With task four, all but one user rated the task as being on the easier side, which is because at least one user was intended to fail their part in the task.

SEQ Aggregate: Completable

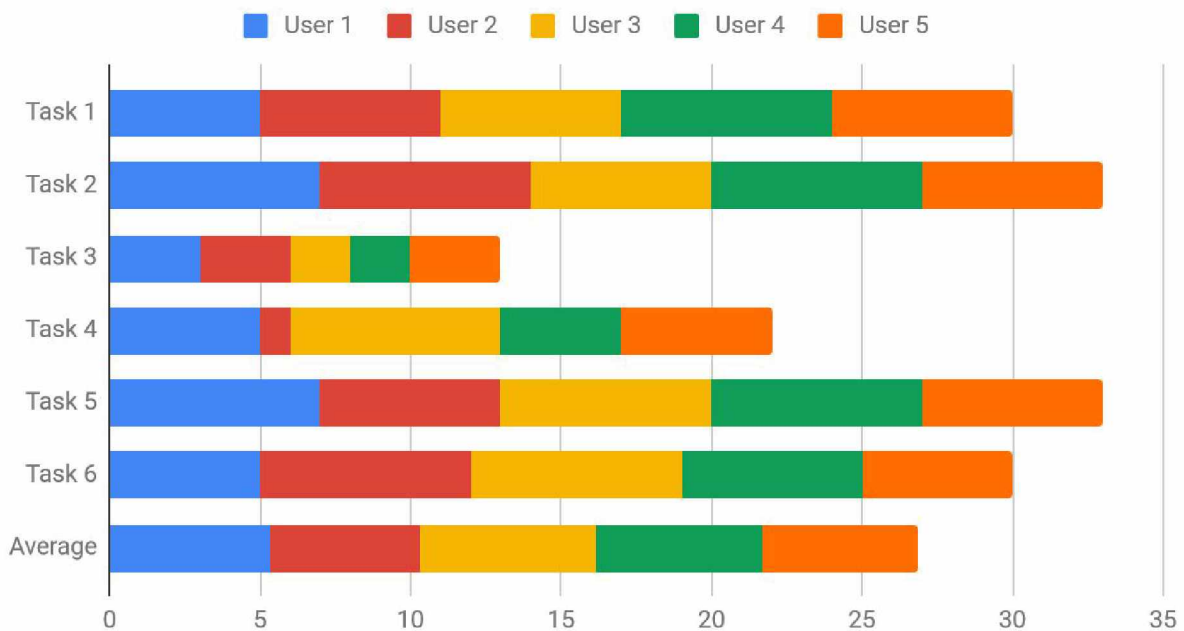


Figure 6.2: Task completable with average

In addition to the stacked bar graph, the percentages in Table 6.1 were calculated with the following equation:

$$\% = (Completability/35) * 100$$

These percentages confirm that most tasks were fairly easy, aside from the two that were designed to be more difficult for some or all of the participants. This indicates that PHILM is largely effective for its purpose.

	Completability	Percent
Task 1	30	85.7%
Task 2	33	94.3%
Task 3	13	37.1%
Task 4	22	62.9%
Task 5	33	94.3%
Task 6	30	85.7%

Table 6.1: Completability interpreted as percentages

6.2.1. Task Efficiency

Efficiency should also be taken into account for the tasks and the equation shown below was used. Although seconds are typically used with this equation, it made more sense to use minutes due to the nature of the tasks. Identifying and clicking a button may take a user only a couple seconds, but searching through a list of movies can take a good several minutes.

The equation and its variables [Sergeev, 2019] are defined as follows:

N = # of goals n_{ij} = result of task i for user j

R = # of users t_{ij} = time spent for user j on task i in minutes

$$\overline{P}_t = \frac{\sum_{j=1}^R \sum_{i=1}^N \frac{n_{ij}}{t_{ij}}}{NR}$$

As expected, the efficiency values are low, this is due to how much time it takes to search through movies and converse with others. Table 6.2, which shows the time taken to complete the tasks in minutes, is organized to show which tasks were started and finished as a group. Different times are recorded for each user for task two because participants started together, but finished the task separately. Interestingly, that was the task that was most efficiently completed by the users.

	User 1	User 2	User 3	User 4	User 5	Efficiency
Task 1	6:34					0.15 goal/min
Task 2	1:48	2:08	3:16	2:13	1:21	0.50 goal/min
Task 3	5:40					0.18 goal/min
Task 4	11:28					0.09 goal/min
Task 5	2:14					0.36 goal/min
Task 6	5:40					0.18 goal/min

Table 6.2: Times and efficiencies per task

6.3. System Usability Scale (SUS)

Table 6.3 shows the five number summary for the SUS data in addition to the number of valid data points and outliers. The summary is illustrated in Figure 6.3 using a box-and-whisker plot. The median describes the approximate collective SUS score for PHILM as 88.75 out of 100, which indicates excellent usability. Note that this is not a percent although it is a score out of 100 [Sauro, 2013]. It was important for the participants to find the web app usable, otherwise the data collected might have been inconclusive.

There was one outlier and after discussing with the participant who gave the low score, it was found that the participant had done work in a helpdesk-type position. As such, the participant had been exposed to many people who had difficulty with tasks considered to be simple. This biased the participant's responses, which resulted in a lower score.

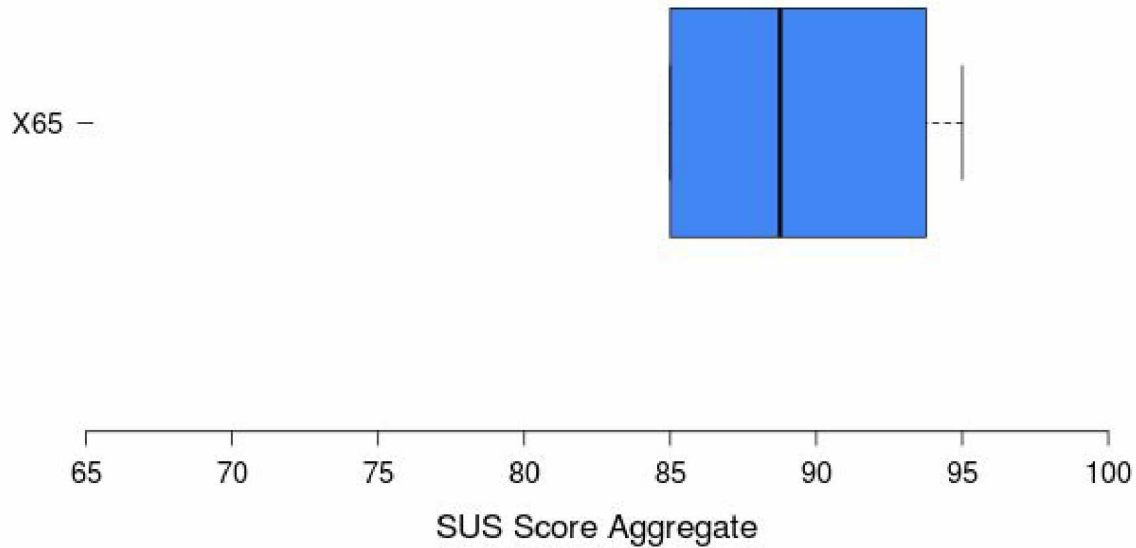


Figure 6.3: Box-and-whisker plot of the SUS score data

Upper whisker	95.00
3rd quartile	93.75
Median	88.75
1st quartile	85.00
Lower whisker	85.00
Valid data points	4
Outliers	1

Table 6.3: Five number summary and data point classifications

6.4. Post-Survey

Prompts one through eight were paired, so it makes more sense to look at the difference between them than at the average percentages – prompts nine and ten were independent, so looking at the average percentages still makes sense (see Figure 6.4). The negative value for prompts one and two indicates that the participants preferred suggestions over commands while its height indicates that their preference was not terribly strong, so active methods may also work for them.

The difference between prompts three and four as well as five and six indicate that being able to access the reviews made by others were somewhat more likely to successfully encourage them to converse with someone else face-to-face. The responses to prompts seven and eight balanced one another out, a few participants explained that whether they agree or disagree with another user's review, it would not change whether they contacted the other user via electronic means or face-to-face.

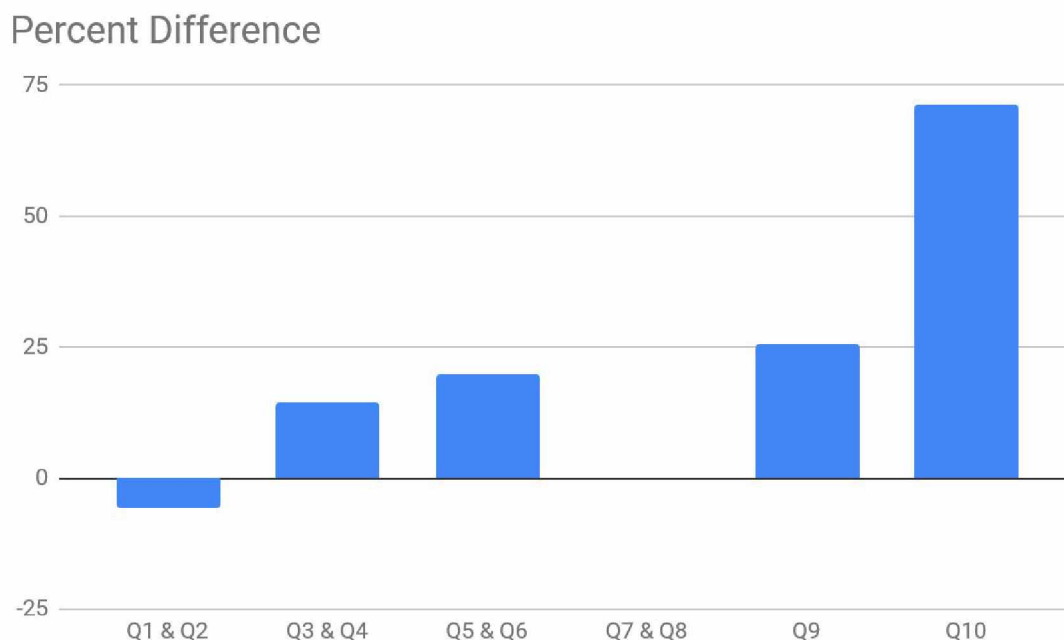


Figure 6.4: Percent difference for paired and percents for unpaired prompts

The participants had very low scores for prompt nine; they would rather not have to deal with an administrator and would rather be able to edit their reviews. Their responses to prompt ten were fairly positive, for the most part, users would like to have a tool like this for their movie collections. One user noted that manual curation was a deal-breaker for them as they strongly preferred it to be automated.

In summary, access to reviews mattered for some users, but not others, for the method of communication they chose to use. Participants also indicated that they were more likely to start a conversation when they disagreed with someone else, which was because they felt there was not much to say when they agreed. A few mentioned that they would also have to feel strongly enough about another person's review to go and talk to them, which explains why the percent difference for prompts three and four as well as five and six were fairly low.

7. Conclusion

Aside from the outlier that occurred due to bias, the user testing participants found PHILM to be usable, so the data collected from them is viable. The greatest indication that PHILM successfully encouraged them to speak to one another during the testing is not the surveys, but the audio recording. The participants spoke much more than expected – quiet spots are rare in the recording. The data from the surveys supports the conclusion: it is possible to encourage users to communicate face-to-face through UI/UX design.

There is still work to be done on this subject. The methods used for passive encouragement were not exhausted during this project. Additionally, active encouragement should also be explored, both independently from passive encouragement and in conjunction with it. Not all users will respond to the same methods, so a mixture of the passive and active would be ideal to reach as many users as possible. Evaluation of both passive and active methods could also be done to determine which methods in both categories are the most effective.

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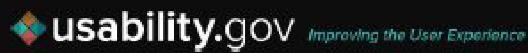
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Appendix A – Consent Form



Consent & Recording Release Form - Adult

I agree to participate in the study conducted and recorded by Addeline Mitchell for her Graduate Project.

I understand and consent to the use and release of the recording by Addeline Mitchell for her Graduate Project. I understand that the information and recording is for research purposes only and that my name and image will not be used for any other purpose. I also understand that the data recorded will be anonymized. I relinquish any rights to the recording and understand the recording may be copied and used by Addeline Mitchell for her Graduate Project without further permission.

I understand that participation in this usability study is voluntary and I agree to immediately raise any concerns or areas of discomfort during the session with the study administrator.

Please sign below to indicate that you have read and you understand the information on this form and that any questions you might have about the session have been answered.

Date: _____

Please print your name: _____

Please sign your name: _____

Thank you!

We appreciate your participation.



Appendix B – Surveys

B.1. Pre-Survey

PHILM Study: Pre-Survey

Indicate to what degree each of the following statements apply to you as a member of a small, centralized community:

When preparing to watch a movie with others, I tend to discuss what to watch in face-to-face conversation with them.

Strongly Disagree ☐ Disagree ☐ Slightly Disagree ☐ Neutral ☐ Slightly Agree ☐ Agree ☐ Strongly Agree ☐

Why? _____

After watching a movie with others, I tend to discuss the movie with them in face-to-face conversation.

Strongly Disagree ☐ Disagree ☐ Slightly Disagree ☐ Neutral ☐ Slightly Agree ☐ Agree ☐ Strongly Agree ☐

Why? _____

When someone I know posts a review of a product or service and I agree with what they wrote, I am likely to start a conversation with them to discuss it.

Strongly Disagree ☐ Disagree ☐ Slightly Disagree ☐ Neutral ☐ Slightly Agree ☐ Agree ☐ Strongly Agree ☐

Why? _____

When someone I know posts a review of a product or service and I disagree with what they wrote, I am likely to start a conversation with them to discuss it.

Strongly Disagree ☐ Disagree ☐ Slightly Disagree ☐ Neutral ☐ Slightly Agree ☐ Agree ☐ Strongly Agree ☐

Why? _____

When initiating a conversation with someone who is in the same building as I am, I am more likely to walk over to them to start a conversation than send an electronic message.

Strongly Disagree ☐ Disagree ☐ Slightly Disagree ☐ Neutral ☐ Slightly Agree ☐ Agree ☐ Strongly Agree ☐

Why? _____

When initiating a conversation with someone who is in the same room as I am, I am more likely to walk over to them to start a conversation than send an electronic message.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

In general, I am likely to move an online conversation to a face-to-face conversation when in relatively close proximity to the person or people I am conversing with.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

Mark your top 5 preferred genres:

- | | | | |
|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|
| <input type="checkbox"/> Action | <input type="checkbox"/> Adventure | <input type="checkbox"/> Animation | <input type="checkbox"/> Biography |
| <input type="checkbox"/> Comedy | <input type="checkbox"/> Crime | <input type="checkbox"/> Documentary | <input type="checkbox"/> Drama |
| <input type="checkbox"/> Family | <input type="checkbox"/> Fantasy | <input type="checkbox"/> Film Noir | <input type="checkbox"/> History |
| <input type="checkbox"/> Horror | <input type="checkbox"/> Music | <input type="checkbox"/> Musical | <input type="checkbox"/> Mystery |
| <input type="checkbox"/> Romance | <input type="checkbox"/> Sci-Fi | <input type="checkbox"/> Short | <input type="checkbox"/> Sport |
| <input type="checkbox"/> Superhero | <input type="checkbox"/> Thriller | <input type="checkbox"/> War | <input type="checkbox"/> Western |

B.2. SEQ

Single Ease Question

Task 1: Movie Night

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 2: Review a Common Movie

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 3: Old, but New

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 4: False Review

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 5: "This is Halloween"

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Task 6: Uncommitted Coworker

Overall, how difficult or easy did you find this task?

Very Difficult	Difficult	Somewhat Difficult	Neutral	Somewhat Easy	Easy	Very Easy
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B.3. SUS

System Usability Scale

Indicate to what degree each of the following statements apply to you:

I think that I would like to use this system frequently.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I found the system unnecessarily complex.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I thought the system was easy to use.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I think that I would need the support of a technical person to be able to use this system.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I found the various functions in this system were well integrated.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I thought there was too much inconsistency in this system.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I would imagine that most people would learn to use this system very quickly.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I found the system very cumbersome to use.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I felt very confident using the system.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I needed to learn a lot of things before I could get going with this system.

Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B.4. Post-Survey

PHILM Study: Post-Survey

Indicate to what degree each of the following statements apply to you as a member of a small, centralized community:

I am more likely to discuss what movie to watch with others, if an element of the webapp directly tells me to do so.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Why? _____

I am more likely to discuss what movie to watch with others, if an element of the webapp suggests that I watch a movie with others.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Why? _____

I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I can see what they wrote about a movie on individual movie pages.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Why? _____

I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I cannot see what they wrote about a movie on individual movie pages.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Why? _____

I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I do have access to the most recently posted reviews.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Why? _____

I am more likely to engage in a face-to-face conversation with others about movies rather than send an electronic message when I do not have access to the most recently posted reviews.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

I am more likely to start a face-to-face conversation with someone rather than send an electronic message when I see they wrote a movie review that I agree with.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

I am more likely to start a face-to-face conversation with someone rather than send an electronic message when I see they wrote a movie review that I disagree with.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

I am more likely to start a face-to-face conversation with an administrator rather than send an electronic message, if I feel the need to amend a review I made and do not have the ability to edit it.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

In general, I feel this is a convenient system and would like to use it or something like it for my own movie collection.

Strongly Disagree Disagree Slightly Disagree Neutral Slightly Agree Agree Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐

Why? _____

Are there any features you would suggest to be added?

Are there any changes you would make to the webapp that could potentially encourage face-to-face communication without making users annoyed or aggravated?